Department of Energy

Idaho Field Office
785 DOE Place
Idaho Falls, ID 83401-1562

June 26, 1992

Dear Citizen,

The Department of Energy, Environmental Protection Agency, and state of Idaho are seeking comments on proposed plans for three sites at the Idaho National Engineering Laboratory. Remedial investigations, the process to determine the extent of contamination, have been conducted at the sites. The remedial investigation reports, including risk assessments, indicate that the contaminants at the three sites do not pose unacceptable risks to human health or the environment. The three sites are:

- **Perched Water System beneath the Test Reactor Area** - This plan considers the impact of contaminated perched water on the Snake River Plain Aquifer. The Perched Water is located 330 feet above the aquifer. No remedial action is recommended with monitoring and periodic reviews to ensure protection of public health and the environment.

- **Motor Pool Pond at the Central Facilities Area** - This plan considers the risks associated with exposure to contaminants in the pond sediments. No remedial action is being considered for this site.

- **Chemical Evaporation Pond at the Auxiliary Reactor Area** - This plan considers the risks associated with esposure to contaminants in the pond sediments. No remedial action is being considered at this site.

The proposed plans for the Perched Water System, Motor Pool Pond, and Chemical Evaporation Pond are enclosed. Briefings on the proposed plans are available to interested citizens during the weeks of July 6 and July 13. The format for a briefing will vary depending on the number of people requesting a briefing in each community. To request a briefing, call the INEL Community Relations Plan Coordinator at (208) 526-6864 or call the INEL Outreach Office in Pocatello (233-4731), Twin Falls (734-0463), or Boise (334-9572).

The public comment period for each of the three proposed plans runs from July 6 to August 5, 1992. The public is encouraged to attend public meetings on the plans during the public comment period, during which both written and verbal comments will be taken. The meetings will be held in the following communities:

July 20	Idaho Falls	Westbank Inn, 475 River Parkway
July 21	Burley	Burley Inn, 800 N. Overland Ave.
July 22	Boise	Boise Public Library, 715 S. Capitol Blvd.
July 23	Moscow	University Inn, 1516 W. Pullman Rd.

The meetings will begin with an informal open house from 5:30 to 6:30 p.m. Federal and state officials will be available to discuss various elements of the plans or answer questions. The open house will be followed by a brief presentation, question and answer session, and public comment session on each of the proposed plans as follows:

5:30 p.m. - Informal Open House
6:30 p.m. - Perched Water System
8:00 p.m. - Motor Pool Pond, Chemical Evaporation Pond

Copies of the Administrative Record file are located at the INEL Information Repository section of public libraries at Idaho Falls, Pocatello, Twin Falls and Boise, at the University of Idaho Library in Moscow, and at the INEL Technical Library in Idaho Falls. The file contains the remedial investigation reports and related documents for each of the three sites.

The public is encouraged to provide written comments by August 5, 1992 by writing to:

Jerry Lyle, Deputy Assistant Manager
Environmental Restoration and Waste Management
DOE Idaho Field Office
P.O. Box 2047
Idaho Falls, ID 83403-2047

I encourage you to read the proposed plans, visit the nearest Information Repository, request a briefing, attend the public meetings, and take advantage of the opportunity to provide written or verbal comments. Your input is important.

Sincerely,

Alice C. Williams, Director
Environmental Restoration Division

June 1992

Idaho National Engineering Laboratory

IDAHO DEPARTMENT OF HEALTH AND WELFARE
DIVISION OF ENVIRONMENTAL QUALITY

Proposed Plan Calls for Monitoring

Perched Water System at the Test Reactor Area, Idaho National Engineering Laboratory

Overview

The purpose of this ***Proposed Plan*** is to summarize information and seek comment on the recommendation by the Department of Energy, Environmental Protection Agency, and state of Idaho that no remedial action be taken for the Perched Water System at the Test Reactor Area. The Perched Water System is a body of groundwater located directly beneath the Test Reactor Area. The Test Reactor Area is located in the southwestern portion of the Idaho National Engineering Laboratory (INEL) which is in southeastern Idaho (see Figure 1). This recommendation is based on a ***Remedial Investigation Report,*** including a baseline risk assessment, which demonstrates that the Perched Water System does not pose an unacceptable risk to human health and the environment based on possible future use scenarios. **Although no remedial action is recommended, monitoring of the Perched Water System and periodic reviews will be conducted to ensure protection of human health and the environment.** Copies of the *Final Remedial Investigation Report for the Test Reactor Area Perched Water System (Operable Unit 2-12)* (EGG-WM-10002), are available in the Administrative Record at the locations listed on page A-11.

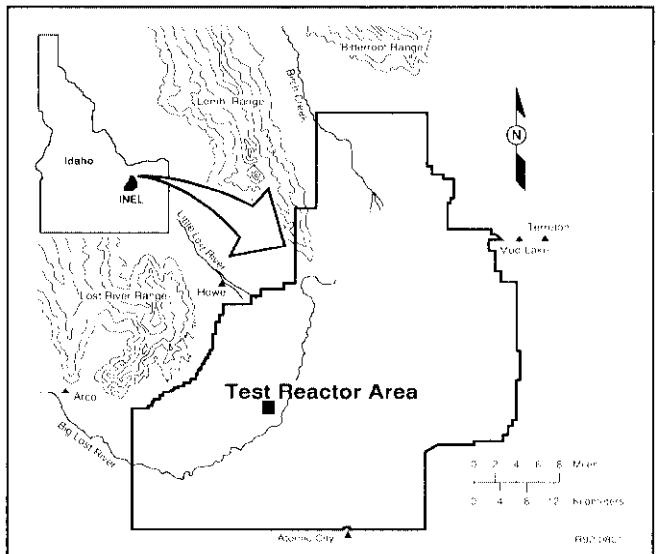


Figure 1. Location of the Test Reactor Area at the INEL.

Public Meetings

Idaho Falls . . . . . ***Monday, July 20***
Westbank Inn
Burley . . . . . ***Tuesday, July 21***
Burley Inn
Boise . . . . . ***Wednesday, July 22***
Boise Public Library
Moscow . . . . . ***Thursday, July 23***
University Inn

An open house is scheduled at each location from 5:30 p.m. to 6:30 p.m. All meetings begin at 6:30 p.m. Both verbal and written comments will be accepted.

Public Comment Period

July 6, 1992 to August 5, 1992

Contents

The U.S. Department of Energy (DOE), prepared this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the ***Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)***, as amended by the Superfund Amendments and Reauthorization Act (SARA): this law is also known as the "Superfund".

The DOE, the U.S. Environmental Protection Agency (EPA), and the Idaho Department of Health and Welfare (IDHW) (hereinafter referred to as the Agencies) are seeking comments from the public on this Proposed Plan.

This plan, submitted in accordance with Section 117(a) of CERCLA, highlights the information on which a no remedial action recommendation, is based. The information summarized in this Proposed Plan can be found in greater detail in the Remedial Investigation Report which is part of the ***Administrative Record***. Copies of the Remedial Investigation Report and other documents in the Administrative Record which support this Proposed Plan are available for public review at the Information Repositories listed on page A-11.

The no remedial action proposal presented in this Proposed Plan represents the Agencies' recommendation based on evaluation of the Perched Water System and its effect on the Snake River Plain Aquifer. The evaluation is presented in the Remedial Investigation Report which was reviewed by EPA and the IDHW. This review consisted of a technical evaluation of groundwater monitoring wells used to collect the data, quality of data used to assess risk at the site, and the computer modeling study used to predict future concentrations of contaminants in the aquifer. The Agencies will make a final decision after the 30-day public comment period has ended and all comments on this plan have been reviewed and considered.

A glossary of technical and administrative terms used in this Proposed Plan is included at the end of the text. ***Words in bold italics are defined in the glossary.***

How you can participate

The public is encouraged to participate in the decision process. You can participate in several ways, including reading additional documents such as the Perched Water Remedial Investigation Report located at one of the Information Repositories listed on page A-11, attending one of the four public meetings listed on page A-1, or commenting on this Proposed Plan. Written and verbal comments will be given equal consideration. Written comments can be submitted to Jerry Lyle at the address on page A-10. Verbal comments can be submitted at the public meetings. Formally submitted verbal and written comments on this plan received during the comment period will become part of the Administrative Record.

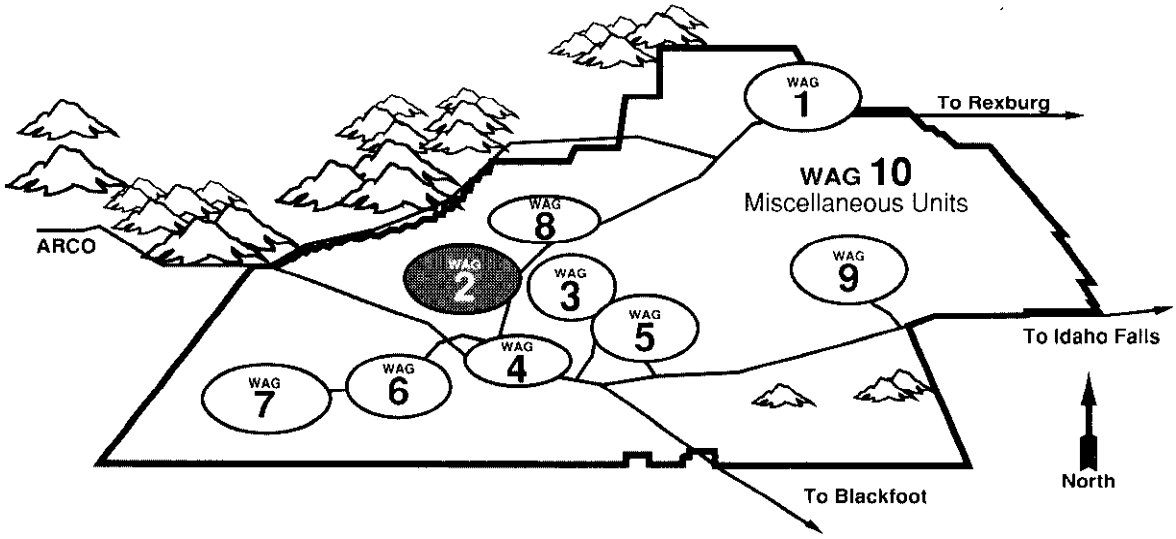
A briefing on this Proposed Plan is available to interested citizens during the weeks of July 6 and July 13. The format for a briefing will vary depending on the number of people requesting it in each community. To request a briefing, call the INEL Community Relations Coordinator at (208) 526-6864.

A ***Responsiveness Summary*** will present a summary of all comments on this plan submitted by the public during the comment period and the Agencies' response. The actual ***remedial action*** decision will be documented in a ***Record of Decision***. The Record of Decision, including the Responsiveness Summary, will be available as part of the Administrative Record. Public notice will be given concerning the availability of these documents.

Background

The INEL is an 890 square mile federal facility managed by DOE. The primary mission of the INEL is nuclear reactor technology development and waste management.

In November 1989, the INEL was put on the ***National Priorities List*** (NPL) of hazardous waste sites. Under CERCLA, the risks posed by hazardous substances at NPL sites must be evaluated and, if necessary, appropriate remediation methods must be selected and implemented to reduce risks.



WAG 1 Test Area North
WAG 2 Test Reactor Area
WAG 3 Idaho Chemical Processing Plant
WAG 4 Central Facilities Area
WAG 5 Power Burst Facility/Auxiliary Reactor Area
WAG 6 Experimental Breeder Reactor-I/ Boiling Water Reactor Experiment
WAG 7 Radioactive Waste Management Complex
WAG 8 Naval Reactors Facility
WAG 9 Argonne National Laboratory-West
WAG 10 Miscellaneous Units including the Snake River Plain Aquifer

R92 0806

Figure 2. Map of the Waste Area Group (WAG) locations at INEL.

To best manage the remedial investigations, the INEL has been divided into 10 waste area groups (see Figure 2). Each waste area group is in turn divided into operable units to expedite investigation and remedial activities. This strategy allows the Agencies to focus resources on those areas that could potentially pose the greatest risk to public health and the environment. Under this management system, Waste Area Group 2 covers the Test Reactor Area. The groundwater that composes the Perched Water System has been designated Operable Unit 2-12.

The ***Federal Facility Agreement and Consent Order*** **(FFA/CO; hereinafter referred to as the Agreement)** and the ***Action Plan*** furnish a framework for the investigation and remediation of each operable unit. These documents, negotiated between the Agencies, describe procedures, processes, and schedules to investigate and remediate the contaminated areas at the INEL. The Agreement was signed by the Agencies on December 9, 1991. Investigations and remediation efforts at the INEL will comply with state and federal environmental laws.

The Perched Water System Operable Unit (designated as Operable Unit 2-12 under the Agreement) has been addressed in a Remedial Investigation Report. The remedial investigation was conducted to determine the effect of the contaminated Test Reactor Area Perched Water System on the Snake River Plain Aquifer and to assess associated risk from possible future use scenarios at that location. The no action recommendation is based upon the information in the Remedial Investigation Report, which is summarized in this Proposed Plan. Public comments on this plan will be considered as part of the decision-making process.

Perched Water System Description

The Perched Water System consists of two distinct zones of perched groundwater beneath the Test Reactor Area: the shallow perched zone (50 feet below ground level), which forms directly beneath each source (see section on Sources of Perched Water), and the more extensive deep perched zone (150 feet below ground level) (see Figure 3, next page). The volume of groundwater in the shallow perched zone is less than one percent of the volume of the deep perched zone. The approximate outer extent of the deep perched water body is shown in Figure 4. Water forming the Perched Water System moves downward from the deep perched zone to the Snake River Plain

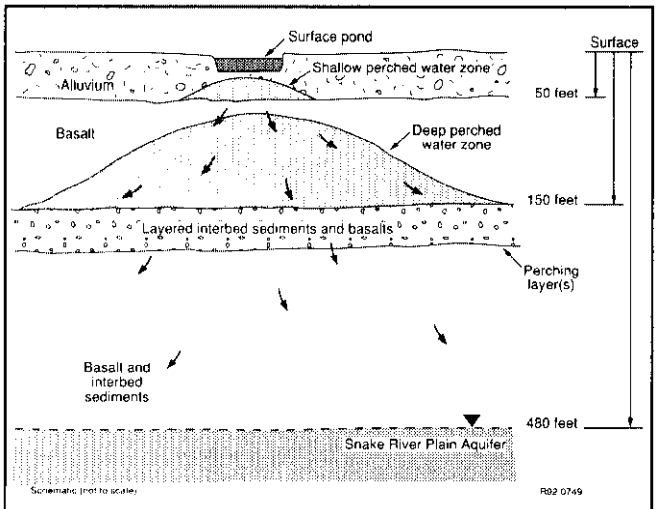


Figure 3. Illustration of perched water system.

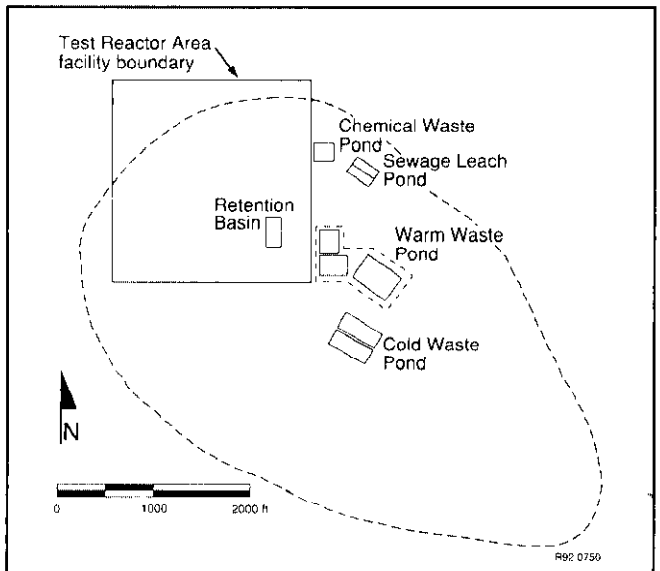


Figure 4. Approximate outer extent of the deep perched water shown by dashed line.

Aquifer. The surface of the aquifer is about 480 feet below ground level in the vicinity of the Perched Water System.

Sources of Perched Water

The Perched Water System is formed as a result of percolation of water from the sources described in the next few paragraphs including four wastewater ponds (the Warm Waste Pond, Cold Waste Pond, Chemical Waste Pond, and the Sanitary Waste Pond) plus the Retention Basin and Well USGS-53 (see Figure 5). The downward flow of water is retarded by layers of relatively low permeability sediments in the subsurface. Sediments in these ponds, and the retention basin associated with the Warm Waste Pond, as well as past contamination of the Snake River Plain Aquifer, are being further evaluated under the Agreement as separate operable units. As a result of infiltration of wastewater discharged to these sources (principally the Warm Waste Pond), several contaminants are present in the soil and groundwater. Whether the contaminants in the wastewater reach the Snake River Plain Aquifer depends upon the ability of the sediments and soils to adsorb the contaminants, the amount of water driving the contaminants into the subsurface, and the concentration of the contaminant in the wastewater.

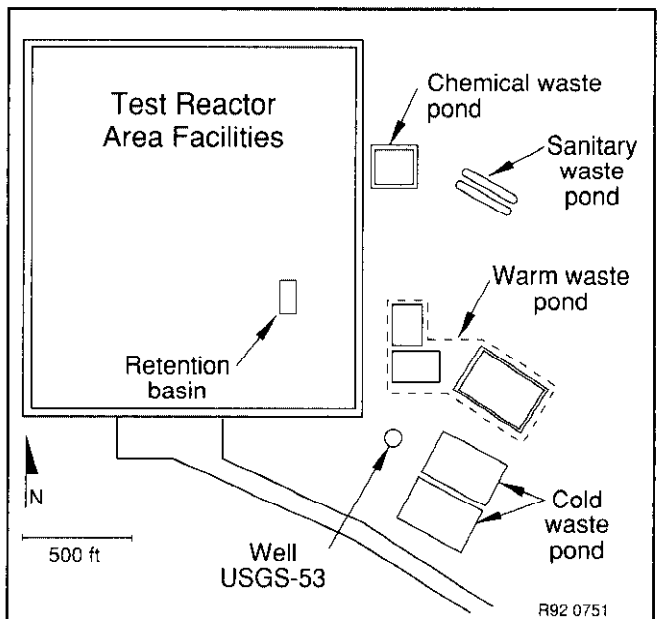


Figure 5. Sources of perched water.

Effluent discharged to the ponds has been regularly monitored by DOE for radioactive contamination since 1952 and for nonradioactive contaminants since 1986. The information is held in a database at INEL known as the Industrial Waste Management Information System. Pertinent information in this database was used to help determine the amount and type of contaminants in the Perched Water System and is discussed in Chapter 4 of the Remedial Investigation Report.

Warm Waste Pond

The Warm Waste Pond has been used in the past for disposal of all nonsanitary waste including low level nuclear reactor cooling water, radioactive wastewater, and discharge from Test Reactor Area water treatment systems (see Figure 5). The Warm Waste Pond is currently used only for disposal of reactor cooling water containing low levels of radioactivity. The effluent discharged to the Warm Waste Pond was the principal source of contamination to the Perched Water System and has been monitored for radioactive contaminants since 1952. This water passes through the sediments of the Warm Waste Pond, potentially carrying the contaminants into the Perched Water System. The average flow of wastewater discharged to the Warm Waste Pond is 30 to 40 gallons per minute. The total amount of wastewater discharged to the Warm Waste Pond from 1952 to 1990 was 5,354 million gallons. The Warm Waste Pond and Retention Basin will both be removed from service in 1993 when a new lined evaporation pond is completed. The levels of radioactive constituents currently discharged to the Warm Waste Pond are significantly less than in the past.

Contaminants from the Warm Waste Pond consist primarily of chromates and radionuclides. The discharge of chromates to the Warm Waste Pond ceased in 1964. Tritium was the most abundant radionuclide discharged to the Warm Waste Pond. The cleanup process for contaminated sediments associated with the Warm Waste Pond has already been initiated under a separate operable unit. Wastewater currently discharged to the Warm Waste Pond will be diverted to a new lined evaporation pond which is being constructed at the present time.

Cold Waste Pond

The Cold Waste Pond was constructed in 1982 to receive nonradioactive wastewater. Cold wastewater is uncontaminated secondary reactor cooling water and includes water from air conditioning units and other nonradioactive drains. The average flow discharged to the pond is 500 gallons per minute (720,000 gallons per day). The total amount of wastewater discharged to the Cold Waste Pond from 1982 to 1990 was 2,130 million gallons. Effluent discharged to the Cold Waste Pond has been monitored since 1986 for nonradiological contaminants. Wastewater from the Cold Waste Pond does not contribute contamination to the Perched Water System. However, it contributes approximately 85 percent of the total volume of water flowing through the Perched Water System.

Chemical Waste Pond

The Chemical Waste Pond was first used in 1962. It has been used to dispose of wastewater from ion exchange columns and water softener treatment systems. Water discharged to the pond contains ion exchange regeneration fluids containing sulfuric acid, sodium hydroxide, and sodium chloride. This wastewater is treated prior to discharge to the pond. The average current discharge to the Chemical Waste Pond is 15 gallons per minute (22,000 gallons per day) while the total amount of wastewater discharged from 1962 to 1990 is estimated at 771 million gallons.

Sanitary Waste Pond

The Sanitary Waste Pond began operation in 1952. The pond is comprised of two unlined lagoons, which were constructed in 1950 and 1965, respectively. The unlined lagoons receive effluent from the sewage treatment plant. The average flow to the ponds is 15 gallons per minute (22,000 gallons per day) while total amount of wastewater discharged to the Sanitary Waste Pond from 1952 to 1990 is estimated at 308 million gallons. The volume of wastewater discharged to the pond has been monitored since 1971.

Retention Basin

The Retention Basin, first used in 1952, is a large underground concrete tank designed to temporarily hold radioactive wastewater en route to the Warm Waste Pond. The Retention Basin was designed to hold this wastewater for up to four days, which would allow some short-lived radionuclides to decay naturally before flowing to the Warm Waste Pond. A leak was discovered in the basin in 1970 that has also contributed to the Perched Water System. The Retention Basin will be removed from service within the next year, when the wastewater is diverted to the new lined evaporation pond currently under construction at the Test Reactor Area.

Well USGS-53

Well USGS-53 is 90 feet deep and was periodically used for disposal of wastewater during the period from 1960 to 1964. The types and quantities of waste discharged to the well are not documented, however, based upon knowledge of the wastewater being generated during this period, the type of waste would have likely been similar to that discharged to the Warm Waste Pond.

Summary of the Remedial Investigation

The purpose of the remedial investigation was to determine the risk posed to human health and the environment by the contaminants in the Perched Water System. Specifically, the remedial investigation is concerned with the potential of the contaminants of concern in the Perched Water System to degrade water quality in the Snake River Plain Aquifer and the risk associated with future and near-term use of the aquifer. Risk associated with the sediments in the ponds at the Test Reactor Area or in the Snake River Plain Aquifer as a result of past wastewater disposal practices are being addressed in separate operable units under the Agreement. Additional information on the risk assessment is in the Remedial Investigation Report, copies of which are available for viewing at the Information Repositories listed on page A-11.

Sampling for Potential Contaminants

The remedial investigation and risk assessment were based upon soil and water samples which were collected from 1990 to 1991 from the shallow and deep perched water zones and the Snake River Plain Aquifer. These samples were analyzed using EPA-approved chemical analytical methods to evaluate for the presence of potential contaminants known to have been discharged in the effluent to the ponds and those contaminants found in previous investigations. Analyses were performed for volatile as well as semi-volatile organic compounds, acrylonitrile, pesticides and PCBs, inorganic compounds, and alpha, beta, and gamma radionuclides. The Remedial Investigation Report also draws upon previous studies of the Perched Water System conducted by DOE and the U. S. Geological Survey which have been ongoing since 1960. Data were evaluated by the Agencies to ensure that they are representative of the area of investigation.

Available information indicates that the water in both the shallow and deep perched water zones has been contaminated by disposal of wastewater from activities at the Test Reactor Area, principally to the Warm Waste Pond. The concentrations of contaminants were generally greater in the shallow perched zone than in the deep perched zone (see Table 1, columns A and B). Contaminant concentrations in the Snake River Plain Aquifer were less than in either the shallow or deep perched water zones. Mean values were obtained by averaging all detected concentrations. Mean concentrations of the contaminants which were determined to be of greatest concern for the shallow and deep perched zones and the Snake River Plain Aquifer beneath the Test Reactor Area are shown in Table 1.

Selection of the Contaminants of Concern

The contaminants of concern, which were used in the risk assessment (in chapter 6 of the Remedial Investigation Report) at the Perched Water System, were selected from the list of contaminants detected during sampling. The hazard identification process discussed below is the means by which the contaminants of concern were identified.

The hazard identification process consisted of two steps. The first step eliminated those contaminants which were not detected or were detected below ***background*** concentrations. Radioactive contaminants were also eliminated at this step if they had a half-life of less than five years and were observed at low concentrations. The second step was an evaluation of the contaminants and their associated potential risks. If a given contaminant contributed to more than one percent of the total risk it was considered to be part of the group of contaminants, known as the contaminants of concern (see section 6.2 of the Remedial Investigation Report).

The contaminants of concern are those which remained after the hazard identification process was completed, and were further evaluated in the Perched Water System remedial investigation (see Table 1). They include the radionuclides:

Table 1. Comparison of mean concentrations of the contaminants of concern in the Perched Water System with drinking water standards.

Contaminants of Concern	A. Shallow Perched Mean Concentration (1990)	B. Deep Perched Mean Concentration (1990)	C. Aquifer Mean Concentration (1990)	D. Predicted Aquifer Concentration at 125 years	E. Drinking Water Standards
Non Radioactive	*(µg/L)*	*(µg/L)*	*(µg/L)*	*(µg/L)*	*(µg/L)*
Arsenic	20.9	4.9	2.75	0.000000000032	50.0
Beryllium	40.0	1.3	0.5	0.00000000000054	1.0
Cadmium	47.5	3.0	2.0	1.30	5.0
Chromium	**1,360.0**	**93.5**	**148.0**	**6.91**	**100.0**
Cobalt	131.0	ND	ND	0.000041	a
Lead	864.0	9.4	4.2	0.0000000000502	50.0
Manganese	19,500.0	255.0	31.3	0.016	a
Fluoride	561.0	180.0	226.0	0.0000000173	a
Radionuclides	*(pCi/L)*	*(pCi/L)*	*(pCi/L)*	*(pCi/L)*	*(pCi/L)*
Cobalt-60	1,530,000	14.3	ND	0.017	b
Cesium-137	2,630,000	ND	ND	0.00000000000000117	b
Americium-241	2,110	ND	ND	0.0000954	15.0
Strontium-90	4,560	31.9	0.0019	0.29	8.0
Tritium	**1,850,000**	**115,000.0**	**130,000.0**	**0.000066**	**20,000.0**

Definitions:

µg/L = Micrograms per liter *pCi/L* = Picocuries per liter ND = Not detected

a = Health based standards have not been established.

b = Standards for beta and photon sources are based on the average annual concentration from man-made sources. If two or more radionuclides are present, the sum total of their annual dose equivalent to the total body or to any organ cannot exceed 4 millirem per year (40 CFR/141).

americium-241, strontium-90, cesium-137, cobalt-60, and tritium and nonradioactive contaminants: arsenic, beryllium, cadmium, chromium, cobalt, fluoride, lead, and manganese. Laboratory analytical results were used to establish historical mean concentrations of the contaminants of concern in the Snake River Plain Aquifer (see column C of Table 1).

Computer Modeling Study

In order to establish the levels of contamination and associated risk to which potential future users of the aquifer would be exposed, a computer modeling study was performed. The computer model predicted concentrations from the present through a point in time 125 years in the future. Column D of Table 1 identifies the concentrations which were predicted by the computer model to be in the Snake River Plain Aquifer in the year 2115 resulting from downward movement of contaminants from the Perched Water System.

The computer model was developed using both historic and recent information concerning groundwater flow and contamination in the Perched Water System and in the underlying Snake River Plain Aquifer in the vicinity of the Test Reactor Area. Development of the model began with identification of the assumptions on which the model is based. The assumptions are based on existing knowledge of groundwater flow in the vicinity of the Test Reactor Area. A comparison of modeling results, known as calibration, was made with historical data to ensure that it represented groundwater flow in the Perched Water System to provide confidence in the models useability for predictions.

Among the assumptions on which the model is based are: 1) the Warm Waste Pond, as the major source of contamination, will be removed from service within one year. This assumption is based on the fact that design and construction of a new lined replacement pond has already begun, and; 2) The Cold Waste Pond will remain in service at least through the year 2007. This is based on the expected operational lifetime of the Test Reactor Area which would then be followed by a 10-year decommissioning period through the year 2016.

In addition to prediction of future concentrations in the Snake River Plain Aquifer, the model also predicted that the Perched Water System would dissipate as a source of contaminated water within approximately six years after the Cold Waste Pond is removed from service. This would occur within the assumed 10-year decommissioning period. Additional information on the computer modeling study can be found in Chapter 5 of the Remedial Investigation Report.

Table 1 identifies the contaminants of concern and their historic mean concentration in the Snake River Plain Aquifer. Contaminants currently exceeding the EPA health-based drinking water standards ***(Maximum Contaminant Levels)*** in the Snake River Plain Aquifer are chromium and tritium.

Assessment of Potential Human Exposure

Several potential exposure scenarios were considered for the analysis of human exposure and associated health risks. An exposure scenario defines exposure pathways from the source to a human receptor. The evaluation of land use scenarios included future residential, agricultural, commercial and industrial uses.

For the purposes of the human health risk assessment, it was assumed that a family would occupy the area over the Perched Water System and engage in agricultural activities such as irrigation of crops, livestock watering, and domestic activities that would utilize water pumped from the Snake River Plain Aquifer. Under this scenario, it is assumed that individuals who occupy the site would ingest the contaminants of concern in Snake River Plain Aquifer at concentrations predicted by the computer model. Future ingestion of the perched water itself is not considered feasible for risk assessment purposes because, according to the results of the computer modeling study, once infiltration from the ponds ceases at the end of Test Reactor Area operations, the Perched Water System will dissipate during the decommissioning period before use could occur. There is also no current use of the perched water or contaminated Snake River Plain Aquifer in the vicinity of the Test Reactor Area. The time-frame for potential exposure to the contaminants of concern from the Perched Water System is discussed below.

The risk analysis was conducted for the assumed family using two general time periods. First, it

was assumed that a 125-year period elapses before individuals occupy the site for a period of 30 years beginning in the year 2115. This is considered a reasonable scenario because the Test Reactor Area is currently a controlled operating reactor site with formal access restrictions which are expected to remain in place for the foreseeable future. Risk was assessed for the 30-year period beginning in 2115 for all of the contaminants of concern listed in Table 1. Second, risk was evaluated for five near-term 30-year exposure periods, from 1990 to 2020, 1995 to 2025, 2000 to 2030, 2005 to 2035 and 2010 to 2040. The contaminants used to perform the health risk assessment for the near-term scenarios were chromium and cadmium for noncarcinogic risks and tritium for carcinogenic risks. These three contaminants were chosen for the near-term assessment because they contributed most to risk in the near-term. These near-term scenarios were assessed to provide an estimate of the potential risk to support this recommendation. Additional information on the risk assessment for the Perched Water System is contained in the Remedial Investigation Report which is part of the Administrative Record.

Risk Assessment Results

Risk assessment results are expressed in terms of noncarcinogenic and carcinogenic risks. Noncarcinogenic risk is expressed in terms of a hazard index, a number which indicates the potential for the most sensitive individuals, such as children, to be adversely affected. The calculated hazard indices are compared to a threshold value of one, established by EPA as an indicator of potential noncarcinogenic effects.

Carcinogenic effects were evaluated to determine the potential increase in cancer occurrences as a result of the presence of radioactive contaminants. As described in the National Contingency Plan, contaminants present in sufficient concentrations to create an excess lifetime cancer risk within or below the range of 1 chance in 10,000 to 1 chance in 1,000,000 is considered by the EPA to be acceptable.

Assessment of Human Health Risk at 125 years

The following contaminants were evaluated for potential noncarcinogenic effects: arsenic, beryllium, cadmium, chromium, cobalt, fluoride, lead, and manganese. The future concentrations predicted by the computer model for each of these contaminants were more than ten times below levels that would pose a potential hazard to human health for the 125-year future use scenario, when compared to a hazard index value of one.

The following contaminants were evaluated for carcinogenic risk: cobalt-60, cesium-137, americium-241, tritium and strontium-90. The total lifetime excess cancer risk is well below the acceptable carcinogenic level for the 125-year future use scenario. According to this evaluation, the total risk is about one in 179 million for a person exposed for a 30-year period to water pumped from the Snake River Plain Aquifer directly beneath the Perched Water System beginning in the year 2115. This is well below the range of concern.

Assessment of Human Health Risk in the Near-Term

The evaluation of risk for the five near-term exposure periods concluded that the noncarcinogenic risk associated with ingestion of groundwater contaminated with cadmium is below acceptable levels for each of the five scenarios. The noncarcinogenic risk from chromium exceeds acceptable levels for the period beginning in 1990 and is at or below acceptable levels thereafter. The carcinogenic risk from tritium exceeds the acceptable risk range for the 30-year periods beginning in 1990 and 1995 then falls within acceptable levels thereafter. This assessment indicates that these contaminants of concern will be within acceptable levels before it is reasonable that the groundwater beneath the Test Reactor Area would be available for residential/agricultural use. Additional information on the near-term assessment is contained in section 6.5 and in Attachment 1 of the Remedial Investigation Report.

A comparison between columns C and E on Table 1 shows that concentrations of chromium and tritium currently exceed EPA drinking water standards (Maximum Contaminant Levels) in the Snake River Plain Aquifer. Concentrations for several contaminants exceed these levels in the Perched Water System. However, there is no risk associated with these contaminants because there is no use of the Perched Water System itself.

There is also no use of the contaminated water in the Snake River Plain Aquifer beneath the Test Reactor Area. The closing of the Warm Waste pond will eliminate future discharge of tritium to the Perched Water System, and therefore the concentrations of tritium (with a half-life of 12.5 years) in the Snake River Plain Aquifer will decrease due to natural radioactive decay. Discontinued discharge of chromium to the Warm Waste Pond has caused concentrations of chromium in the Snake River Plain Aquifer to decline. The computer model predicts that the concentration of tritium will be below drinking water standards by the year 2004. The concentration of chromium will be below the drinking water standards by the year 2010. No other contaminants are predicted to exceed drinking water standards in the future.

Environmental Risks

The environmental risk assessment evaluated the adverse risks to animal populations and communities of organisms associated with the Perched Water System. The only potential pathway for ecological exposure under the 125-year future use scenario is for these populations or communities to come into contact with water or contaminants from the Perched Water System. At the present time, there is no such contact. Such contact would only be possible by humans pumping contaminated water and making it available for these animal populations or communities of organisms. In this case, the predicted concentrations in Table 1 do not indicate an unacceptable risk to the environment in the future use scenario.

Summary of the "No Remedial Action" Recommendation

The risk assessment performed for the Perched Water System indicates that the contaminants of concern do not pose unacceptable risks to human health or the environment for expected near-term or 125-year scenarios of future use of the Snake River Plain Aquifer beneath the Test Reactor Area. Therefore, no remedial action is recommended by the Agencies.

This recommendation is based upon predicted concentrations in the Snake River Plain Aquifer. The predicted concentrations of the contaminants in the Aquifer are based on the assumptions that the Warm Waste Pond will be removed from service within the next year and that use of the Cold Waste Pond will continue under similar conditions through the expected life of Test Reactor Area operations.

If a no remedial action decision is made after public comments have been considered, monitoring of the Perched Water System and Snake River Plain Aquifer as well as periodic reviews will be conducted by EPA and the IDHW. The reviews will be performed to ensure that the assumptions upon which the decision is based are still valid. These reviews would include evaluation of land use and results of groundwater monitoring. Details for development of the proposed monitoring plan and criteria for termination of the reviews will be outlined in the Record of Decision. The monitoring plan will be developed with the approval of EPA and the IDHW as defined in the Federal Facility Agreement and Consent Order.

The Remedial Investigation Report and other information that supports the no remedial action recommendation are available in the Administrative Record. Copies are also available at the Information Repositories listed on page A-11.

Addresses

The Agencies encourage your participation in this process. If you wish to make comments on this Proposed Plan for "No Remedial Action" before the end of the comment period, August 5, 1992, please write to:

Jerry Lyle, Deputy Assistant Manager
Environmental Restoration and
Waste Management
DOE-Idaho Field Office
P.O. Box 2047
Idaho Falls, ID 83403-2047

You may also make verbal comments while attending one of the public meetings listed on page A-1. Your comments are important. Both written and verbal comments on the plan will be evaluated, summarized, and responses provided in the Responsiveness Summary section of the Record of Decision for the Test Reactor Area Perched Water System.

Additional Information

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INEL Community Relations Plan
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Idaho Falls, ID 83403-2047
(208) 526-6864

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Environmental Protection Agency
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Seattle, WA 98101
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Mr. Dean Nygard
State of Idaho
Department of Health and Welfare
Division of Environmental Quality
1410 N. Hilton
Boise, ID 83706
1-800-232-4653 or (208) 334-5860

Information Repositories

INEL Technical Library
1776 Science Center Drive
Idaho Falls

Idaho Falls Public Library
457 Broadway
Idaho Falls

Twin Falls Public Library
434 2nd Street East
Twin Falls

Pocatello Public Library
812 East Clark Street
Pocatello

Boise Public Library
715 South Capital Blvd.
Boise

University of Idaho Library
University of Idaho Campus
Government Document Dept.
Rayburn Street
Moscow

Glossary and Acronyms

Action Plan - Document that defines the schedule and procedures for implementing the Federal Facility Agreement and Consent Order between DOE, EPA, and IDHW.

Administrative Record - Supporting information and analyses upon which the Agencies base their recommendations in a Proposed Plan. Following the public comment period, records of public comments are added, which the Agencies review and consider before reaching a decision. The Record of Decision and Responsiveness Summary are also added to the record, after approval by the Agencies.

Area of contamination - Aerial extent of contamination and all suitable areas in the proximity of the contamination necessary for implementation of the remedy.

Background - Levels of naturally occurring metals and radionuclides in monitoring wells around TRA. Investigation data are compared to these levels to identify potential contamination.

Comprehensive Environmental Response, Compensation, and Liability Act - Act that identifies sites where hazardous substances have been or might be released into the environment and ensures that they are cleaned up. Commonly called Superfund, implemented by 40 Code of Federal Regulations (CFR) 300.

Federal Facility Agreement and Consent Order (FFA/CO) and Action Plan - The agreement between U.S. Department of Energy, U.S. Environmental Protection Agency, and State of Idaho that establishes the framework for CERCLA activities at the INEL. The ***Action Plan*** defines the schedules and procedures for implementing the agreement.

Hazardous Waste Management Act - Idaho law that governs hazardous waste.

Maximum Contaminant Level - The maximum concentration of a contaminant allowed in a public drinking water system under the Safe Drinking Water Act.

mrem - One-thousandths of a Roentgen-equivalent-man, a unit of radiation that relates to biological damage in the human body caused by radiation.

National Contingency Plan - CERCLA regulations (40 CFR 300) that establish requirements for responding to releases of hazardous substances in the environment and for setting cleanup standards.

National Priorities List (NPL)- EPA's list of the most serious hazardous waste sites identified for investigation and possible long-term remedial action under CERCLA. Sites are placed on the NPL as a result of a ranking system that assesses the threats posed to human health and the environment due to actual or potential contamination. The purpose of the NPL is to inform the public of the most serious hazardous waste sites in the nation.

Picocurie - One-trillionth of a curie (pCi).

Proposed Plan - A document which provides a brief summary of the key factors leading to the Agencies recommendation. Public comments on the plan are solicited by the Agencies and are used during the development of the Record of Decision.

Record of Decision - A public document that presents the selection of a remedial alternative under CERCLA by technically describing the selected remedy and providing summary information about the site. It contains the Responsiveness Summary (see below).

Remedial action - Action to remediate sites in phases using operable units as early actions to eliminate, reduce, or control the hazards posed by a site or to expedite the completion of total site cleanup.

Remedial Investigation Report - Document that describes the characterization of the nature and extent of contamination at a Superfund site, and along with the Baseline Risk Assessment, is used to evaluate potential risks to human health and the environment.

Resource, Conservation and Recovery Act (implemented by 40 CFR 260)—Act that defines hazardous waste and the requirements for dealing with hazardous waste.

Responsiveness Summary - The part of the Record of Decision that summarizes comments received from the public on the Proposed Plan and allows the Agencies an opportunity to provide a written response.

Risk assessment scenarios—Settings evaluated for risk. For example, the risk assessment scenario for the human health risk evaluation in this Proposed Plan occurs 125 years in the future.

June 1992

IDAHO DEPARTMENT OF HEALTH AND WELFARE
DIVISION OF ENVIRONMENTAL QUALITY

Idaho National Engineering Laboratory

Proposed Plan for the Central Facilities Area Motor Pool Pond, Idaho National Engineering Laboratory

Overview

The purpose of this ***Proposed Plan*** is to summarize information and seek public comment on the recommendation by the Department of Energy, Environmental Protection Agency, and state of Idaho that no remedial action be taken for the sediments within the Motor Pool Pond at the Central Facilities Area. This proposal is based on a ***Remedial Investigation Report***, including the baseline risk assessment, and is available in the Administrative Record at the locations listed on page B-7. The risk assessment demonstrates that the site does not pose an unacceptable risk to workers or future populations. The Central Facilities Area is located in the southern portion of the INEL, which is in southeastern Idaho (see Figure 1).

The Department of Energy, Idaho Field Office (DOE-ID), prepared this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (***CERCLA***; also known as "Superfund"), and in accordance with the *INEL Community Relations Plan*. An investigation was conducted at the Motor Pool Pond by the DOE-ID with oversight by the U.S. Environmental

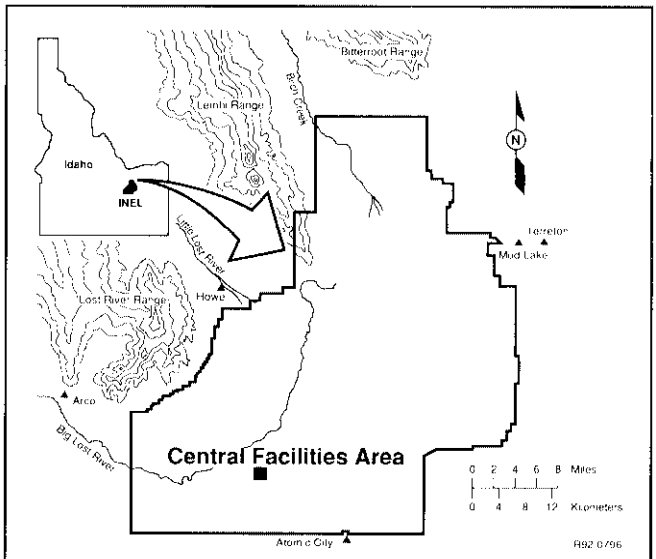


Figure 1. Location of the Central Facilities Area at the INEL.

Public Meetings

Idaho Falls . . . . . ***Monday, July 20***
Westbank Inn
Burley . . . . . ***Tuesday, July 21***
Burley Inn
Boise . . . . . ***Wednesday, July 22***
Boise Public Library
Moscow . . . . . ***Thursday, July 23***
University Inn

An open house is scheduled at each location from 5:30 p.m. to 6:30 p.m. All meetings begin at 6:30 p.m. Both verbal and written comments will be accepted.

Public Comment Period

July 6, 1992 to August 5, 1992

Contents

Protection Agency (EPA) and the Idaho Department of Health and Welfare (IDHW) (hereinafter referred to as the Agencies). The remedial investigation was developed in accordance with the ***National Contingency Plan*** to determine the potential risks posed by contamination at the Motor Pool Pond.

This Proposed Plan summarizes information found in the *Final Remedial Investigation Report for the CFA Motor Pool Pond (Operable Unit 4-11) at the Idaho National Engineering Laboratory* (EGG-WM-9973), which is available for public review in the ***Administrative Record***. The Administrative Record contains all technical and supporting documentation used to prepare this plan. Copies of the Administrative Record may be reviewed at the Information Repositories listed on page B-7.

A glossary of technical and administrative terms used in this Proposed Plan has been included at the end of the text. ***Words in bold italics are defined in the glossary.***

How You Can Participate

The purpose of this Proposed Plan is to solicit public input on the "No Action" proposal. "No Action" is proposed by the Agencies based on an evaluation of the risks posed by exposure to contaminants at the Motor Pool Pond. The Agencies will consider all public comments on this plan in preparing a ***Record of Decision***. Comments will be summarized and responses will be provided in the ***Responsiveness Summary*** section of the Record of Decision.

Verbal or written comments may be made during the public meetings shown on page B-1, or comments may be submitted in writing anytime throughout the comment period: July 6 to August 5, 1992.

A briefing on this Proposed Plan is available to interested citizens during the weeks of July 6 and July 13. The format for a briefing will vary depending on the number of people requesting it in each community. To request a briefing, call the INEL Community Relations Coordinator at (208) 526-6864.

Background

The INEL is a government-owned, contractor-operated DOE facility that encompasses approximately 890 square miles on the Eastern Snake River Plain in southeastern Idaho. The primary missions of the INEL are nuclear reactor technology development and waste management.

In November 1989, the INEL was placed on the ***National Priorities List*** (NPL), which designates hazardous waste sites requiring investigation under the Superfund law. Sites are placed on the list as a result of a ranking system that assesses the seriousness of threats posed to human health and the environment due to actual or potential environmental contamination. Once these sites are identified, they are investigated under the CERCLA process.

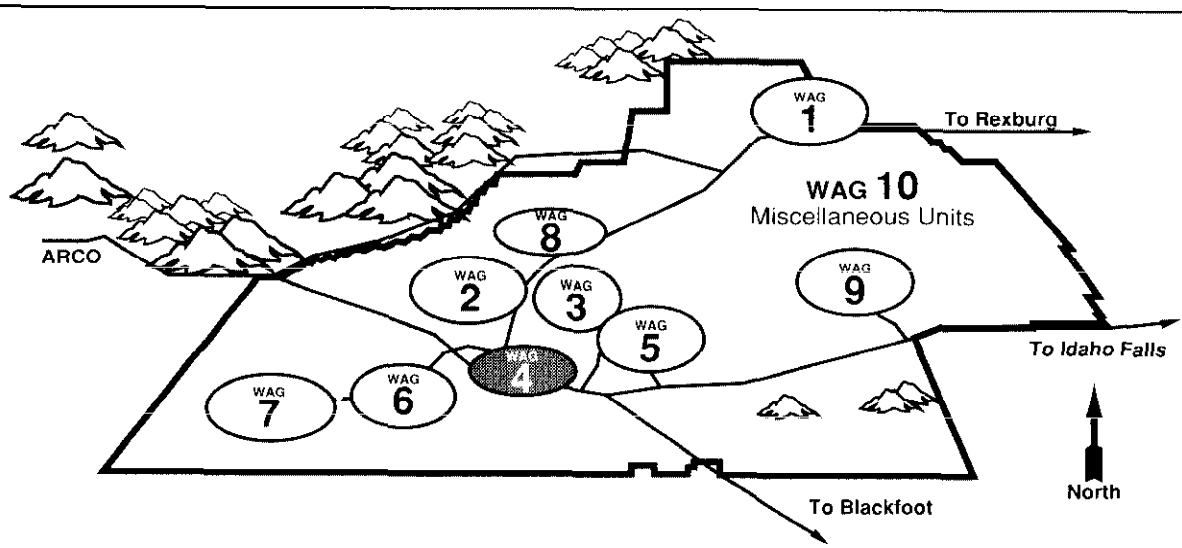
To better manage the investigations, the INEL has been divided into 10 Waste Area Groups (see Figure 2). Each Waste Area Group contains several waste disposal areas called operable units. This strategy allows the Agencies to focus available cleanup resources on those areas that pose the greatest potential risks to human health and the environment. Waste Area Group-4 consists of 12 operable units located at Central Facilities Area. The Motor Pool Pond is Operable Unit 4-11.

The characterization and any required cleanup of each operable unit at the INEL are guided by the ***Federal Facility Agreement and Consent Order and Action Plan***. These documents, negotiated by the Agencies, provide procedures and schedules to ensure the investigations will be conducted in compliance with state and federal environmental laws.

Site Description

The Central Facilities Area, which is located in the south-central portion of the INEL, is an administrative and support area that includes security, environmental chemistry laboratories, motor pool and maintenance shops for buses and cars, a general warehouse, the DOE Radiological and Environmental Sciences Laboratory, a dispensary, and other support facilities.

The Motor Pool Pond is an unlined evaporation pond located in an abandoned gravel pit



WAG 1 Test Area North
WAG 2 Test Reactor Area
WAG 3 Idaho Chemical Processing Plant
WAG 4 Central Facilities Area
WAG 5 Power Burst Facility/Auxiliary Reactor Area
WAG 6 Experimental Breeder Reactor-I/ Boiling Water Reactor Experiment
WAG 7 Radioactive Waste Management Complex
WAG 8 Naval Reactors Facility
WAG 9 Argonne National Laboratory-West
WAG 10 Miscellaneous Units including the Snake River Plain Aquifer

R92 0800

Figure 2. Map of the Waste Area Group (WAG) locations at INEL.

approximately 1,200 feet east of the Equipment Yard (see Figure 3). An 8-inch diameter concrete pipe extends southeast from the service station approximately 1,056 feet and discharges to a ditch. The ditch ranges from approximately 3 feet deep near the pipe outlet to approximately 6 feet deep near the pond inlet. The bottom of the ditch is 3 to 6 feet wide. A windrow of excavated sediments is adjacent to the ditch along its north side. This material was apparently removed to improve the flow of wastewater through the ditch. The ditch extends approximately 225 feet to an old gravel pit and then continues for an additional 325 feet to a low spot along the south side of the pit. A small pond, approximately 120 feet long and 60 feet wide at its widest point, formed in the low spot when wastes were being discharged (see Figure 4). The pond is currently dry; however,

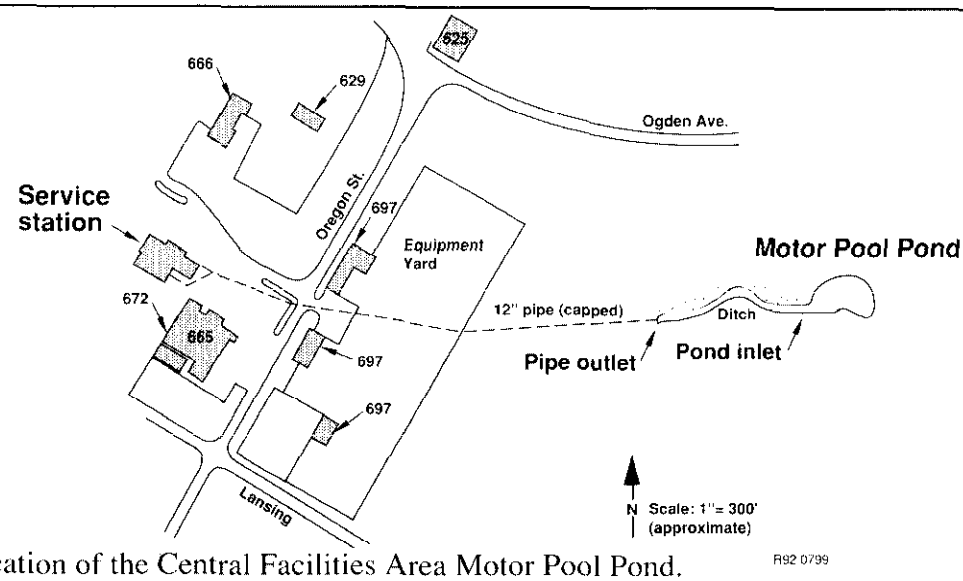


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Figure 3. Location of the Central Facilities Area Motor Pool Pond.

runoff may temporarily accumulate in the pond after storm events and during spring thaws.

Source of Contamination

The Motor Pool Pond received wastes from two sumps located at the service station. One sump is located in the Bus Wash Bay and collected wastes from bus washes and from floor drains in the adjacent Service Bay. The Service Bay is used to perform routine servicing of fleet vehicles. The second sump is located outside the station and collected wastes from the Steam Cleaning Bay and roof downspouts. The Motor Pool Pond received wastes from the Wash Bay and Outside Sumps from 1951 until 1985. After 1985, the wastes were diverted through an oil/water separator to a sanitary sewer line connected to the Sewage Treatment Plant.

During the 35-year service life of the Motor Pool Pond, the waste stream mainly consisted of wastewater from washing vehicles. According to service station personnel, the waste volumes were highest from 1978 until 1985, when automatic washing systems were in place at the service station. The automatic systems enabled washing of up to 30 buses and 10 cars and trucks per day. These washes are estimated to have generated up to 4,200 gallons of wastewater per day that were discharged to the pond.

The wastes from vehicle washes can be assumed to have contained metals and organic compounds associated with road dust, oil, and grease. On several occasions, vehicles and equipment with small amounts of radioactive contamination were decontaminated at the station. Because the Central Facilities Area is not a controlled area where radioactive materials are handled in large amounts, highly contaminated vehicles were not decontaminated at the service station.

Type and Extent of Contaminants

In 1989, a total of 51 samples were collected from soils and sediments in and around the pond. Samples were collected at the surface, at intermediate depths, and from sediments just above bedrock, which varies from 2 to 18 feet below the surface. Sample locations included the discharge pipe outlet, the ditch, sediment excavated from the ditch, the pond area, and the pond area's northern perimeter. The samples were analyzed for metals, organic compounds, and radionuclides. Analyses for metals and organic compounds were performed using standard EPA methods.

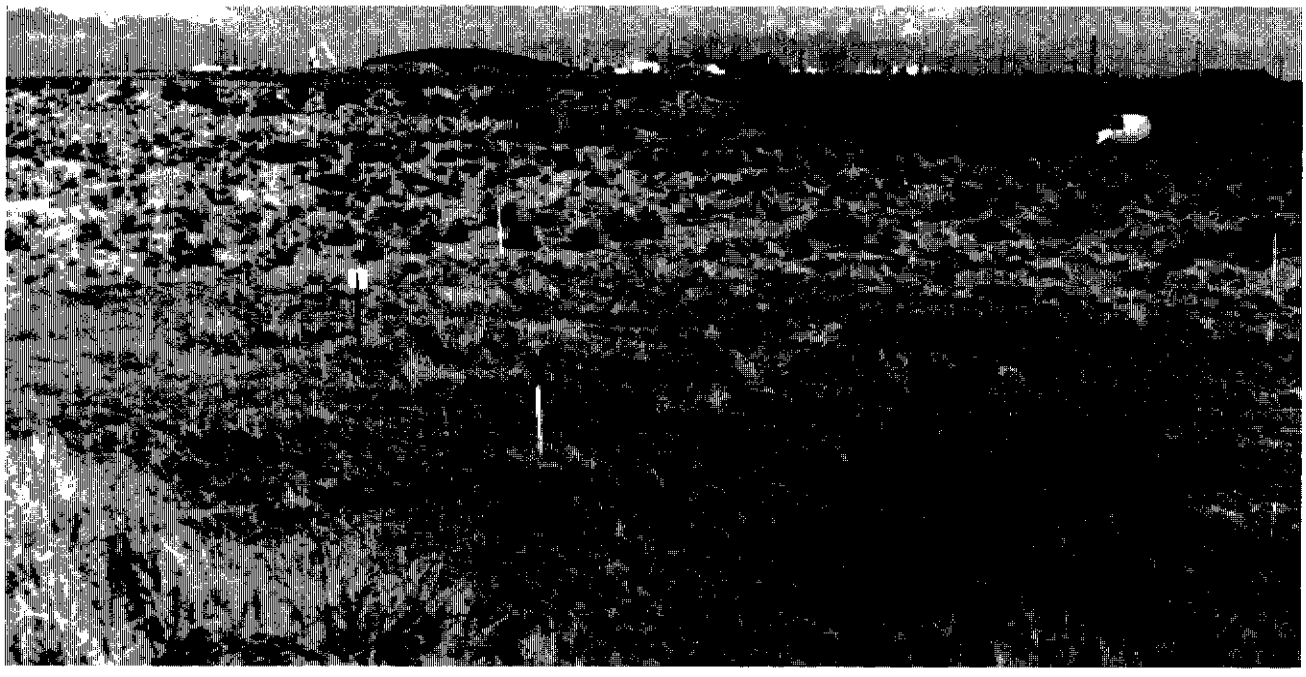

Figure 4. Photo showing the Central Facilities Area with Motor Pool Pond in foreground.

Contaminants of Concern

Barium, beryllium, cadmium, chromium, lead, mercury, and thallium were found in concentrations exceeding ***background*** levels in the Motor Pool Pond area (see Table 1). Cadmium and lead concentrations were 10 to 25 times greater than background. Chromium levels were 2 to 3 times higher than background. These elevated concentrations were found in the surface and subsurface in the ditch and pond area, and in the sediments excavated from the ditch.

Volatile organic compounds were also detected. Four compounds were detected at a depth of 13 feet in the center of the former pond area: acetone, 2-butanone, 4-methyl 2-pentanone, and methylene chloride. Methylene chloride and tetrachloroethylene were also detected in two samples collected from the excavated sediments. Concentrations ranged from 6 to 90 µg/kg (micrograms per kilogram or parts per billion).

The ***polychlorinated biphenyl*** Aroclor-1260 was detected in two samples collected from the ditch near the pipe outlet. The highest concentration was 1,470 µg/kg (micrograms per kilogram or parts per billion).

The ***radionuclides*** americium-241, cesium-137, and plutonium-239 were detected in low concentrations in surface sediments in the ditch and the former pond area. The highest concentration detected was 8.4 ***picocuries*** per gram (pCi/g) for cesium-137.

Summary of Site Risks

A ***baseline risk assessment*** was performed to evaluate potential risks to human health from contaminants detected in the Motor Pool Pond sediments. Potentially exposed populations at the Motor Pool Pond include current workers at Central Facilities Area and future residents. Workers and future residents were assumed to be exposed to contaminants by inhalation, ingestion, contact with the skin, and direct radiation.

A detailed discussion of risk assessment assumptions and processes is presented in the Remedial Investigation Report, which is available in the Administrative Record.

Table 1. Metals concentrations in Motor Pool Pond sediments at the Central Facilities Area.

Metal	Concentration range in sediments mg/kg (parts per million)	Average background concentration mg/kg (parts per million)
Barium	93.0 - 434.0	230.0
Beryllium	0.43 - 1.4	<0.23
Cadmium	0.44 - 38.8	1.0
Chromium	8.2 - 91.3	22.0
Lead	10.6 - 631.0	26.0
Mercury	0.58 - 1.2	<0.09
Thallium	0.33 - 1.0	0.36

The potential for groundwater to become contaminated by wastes in the Motor Pool Pond was evaluated in the Remedial Investigation Report. Computer modeling was performed to assess the migration of contaminants from the sediments to groundwater. The results of the modeling show that regulatory standards for groundwater would not be exceeded.

Risk Calculations

The risks posed by exposure to the contaminants in the pond include those associated with the carcinogenic effects from radionuclides and carcinogenic and non-carcinogenic effects from Aroclor-1260 and metals. Risk from exposures to volatile organic compounds contributed less than 1% of the total risk.

Health risks were evaluated by calculating the exposures to and the toxicity of the contaminants. The calculations were performed using nationally recognized EPA guidance and standard parameters. The standard or "default" ***exposure frequency*** used for workers was 250 days per year (5 days per week, 50 weeks per year). For future residents, the default exposure frequency used was 350 days per year.

Additional risk calculations were performed by adjusting the exposure frequency to reflect site-specific conditions at the Motor Pool Pond. Because the pond is inactive and isolated from other facilities, Central Facilities Area workers were assumed to be exposed by inhalation 5% of the time they spend at work and by ingestion, dermal contact, and direct radiation 1% of the

Table 2. Summary of risks at the Central Facilities Area Motor Pool Pond.

Scenario	Contaminants	A. Carcinogenic Risk		B. Non-Carcinogenic Risk (Hazard Index)	
		Default	Site-Specific	Default	Site-Specific
Occupational (Central Facilities Area Workers)	Radionuclides	3 in 10,000 ($3x10^{-4}$)	3 in 1,000,000 ($3x10^{-6}$)	NA*	NA
	Chemicals	5 in 100,000 ($5x10^{-5}$)	5 in 10,000,000 ($5x10^{-7}$)	0.7	0.02
	Total worker risk	4 in 10,000 ($4x10^{-4}$)	4 in 1,000,000 ($4x10^{-6}$)	0.7	0.02
Future Residential	Radionuclides	4 in 100,000 ($4x10^{-5}$)	7 in 1,000,000 ($7x10^{-6}$)	NA	NA
	Chemicals	9 in 100,000 ($9x10^{-5}$)	1 in 100,000 ($1x10^{-5}$)	1.4	0.7
	Total residential risk	1 in 10,000 ($1x10^{-4}$)	2 in 100,000 ($2x10^{-5}$)	1.4	0.7

* Hazard indices are not applicable to radionuclides.

time. For future residents, exposure frequencies were based on site-specific estimates of outdoor activity (50 days per year). Additional discussion of exposure parameters is included in the Remedial Investigation Report.

Exposure to Carcinogens

Carcinogenic effects were estimated for exposure to beryllium, cadmium, chromium, and Aroclor-1260 for workers currently at Central Facilities Area exposed over a 25-year period and for future residents over a 30-year period. Carcinogenic effects from exposure to radionuclides were also calculated for current workers and future residents. The carcinogenic risks are summarized in Table 2, column A.

Carcinogenic risks are evaluated by comparison to the acceptable risk range of 1 additional chance in 10,000 of lifetime cancer risk to 1 chance in one million (1×10^{-4} to 1×10^{-6}). The range has been established by the EPA for evaluating risks from contamination at National Priorities List sites. Using the EPA default parameters, total risks to workers are estimated to be 4 in 10,000 (4×10^{-4}), and total risks to future residents are estimated to be 1 in 10,000 (1×10^{-4}). Exposure parameters that are site-specific for the Motor Pool Pond resulted in a total carcinogenic risk of 4 in a million (4×10^{-6}) for workers and 2 in 100,000 (2×10^{-5}) for future residents.

Exposure to Non-carcinogens

The non-carcinogenic risks from exposure to metals and Aroclor-1260 were evaluated by calculating a hazard index using reference doses established by EPA. Reference doses identify the exposure level which may adversely affect sensitive individuals. EPA has determined that a hazard index greater than one (1) may result in potential non-carcinogenic effects. The hazard indices, calculated using EPA default parameters, are 0.7 for Central Facilities Area workers and 1.4 for future residents (see Table 2, column B). Using site-specific exposure parameters, the hazard index calculated for workers was 0.02 and for future residents, 0.7.

Ecological Risk Assessment

The contaminants of concern, which are metals, one polychlorinated biphenyl, and radionuclides, are limited in distribution and typically are immobile in sediments. These factors, combined with the lack of water, vegetation, and habitat

value for wildlife, are likely to limit uptake and accumulation of contaminants in the food chain. A qualitative ecological risk assessment was performed to evaluate the potential impacts of contaminated sediments on local plant and animal populations and any endangered species or critical habitats present. Based on the ecological risk assessment, the contamination in the Motor Pool Pond is not considered to have any significant disruptive effects on animal or plant populations or the local ecosystem.

Summary of the "No Action" Proposal

Based on the estimated risks shown in Table 2, the contaminated sediments in the Motor Pool Pond do not pose unacceptable risks to human health or the environment. Therefore, the Agencies recommend that "No Action" be taken. The Remedial Investigation Report and other information that supports the "No Action" proposal are available in the Administrative Record, copies of which are available at the Information Repositories listed at right.

Addresses

The Agencies encourage your participation in this process. If you wish to make comments on this Proposed Plan for "No Action" before the end of the comment period, August 5, 1992, please write to:

Jerry Lyle, Deputy Assistant Manager
Environmental Restoration and
Waste Management
DOE-Idaho Field Office
P.O. Box 2047
Idaho Falls, ID 83403-2047

You may also make verbal comments while attending one of the public meetings listed on page B-1. Your comments are important. Both written and verbal comments on the plan will be evaluated, summarized, and responses provided in the Responsiveness Summary section of the Record of Decision for the Motor Pool Pond.

Additional Information

Mr. Reuel Smith, Coordinator
INEL Community Relations Plan
P.O. Box 2047
Idaho Falls, ID 83403-2047
(208) 526-6864

Mr. Wayne Pierre
Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, WA 98101
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Mr. Dean Nygard
State of Idaho
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Glossary and Acronyms

Administrative Record - Supporting information and analyses upon which the Agencies base their recommendations in a Proposed Plan. Following the public comment period, records of public comments are added, which the Agencies review and consider before reaching a decision. The Record of Decision and Responsiveness Summary are also added to the record, after approval by the Agencies.

Background - Natural levels of metals in nearby undisturbed soils that were compared with metal levels in the Central Facilities Area Motor Pool Pond sediments to identify potential contamination.

Baseline risk assessment - Procedures established by EPA for evaluating potential risks to human health and the environment, which involve gathering, organizing, and presenting information on the toxicity of and potential exposures to contaminants. The baseline risk assessment identifies the level of risk that exists if no cleanup is performed, and allows risk-based decisions to be made regarding the need for cleanup.

CERCLA - (Comprehensive Environmental Response, Compensation, and Liability Act, commonly called Superfund) - A federal law passed by Congress in 1980 that establishes a program to identify sites where hazardous substances have been, or might be, released into the environment, and to ensure that the sites are remediated. CERCLA was modified by Congress in 1986 with the Superfund Amendment and Reauthorization Act.

Exposure frequency - Length of time an individual is exposed to a contaminant, usually expressed in days per year.

Federal Facility Agreement and Consent Order (FFA/CO) and Action Plan - The agreement between U.S. Department of Energy, U.S. Environmental Protection Agency, and state of Idaho that establishes the framework for CERCLA activities at the INEL. The ***Action Plan*** defines the schedules and procedures for implementing the agreement.

National Contingency Plan - CERCLA regulations (40 CFR 300) that establish requirements for responding to releases of hazardous substances in the environment and set cleanup standards.

National Priorities List (NPL) - EPA's list of the most serious hazardous waste sites identified for investigation and possible long-term remedial action under CERCLA. Sites are placed on the NPL as a result of a ranking system that assesses the threats posed to human health and the environment due to actual or potential contamination. The purpose of the NPL is to inform the public of the most serious hazardous waste sites in the nation.

Picocurie - A unit of measure for radioactivity. One curie corresponds to 37 billion disintegrations per second; one picocurie is one-trillionth of a curie.

Polychlorinated biphenyl (PCB) - A high molecular-weight halogenated organic compound formerly used in dielectric fluids in transformers.

Proposed Plan - A document that provides a brief summary of the key factors leading to the Agencies' recommendation. Public comments on the plan are solicited by the Agencies and are used during the development of the Record of Decision.

Radionuclides - Naturally-occurring and man-made elements that emit ionizing radiation.

Record of Decision - A public document that presents the selection of a remedial alternative under CERCLA by technically describing the selected remedy and providing summary information about the site. Contains the Responsiveness Summary (see below).

Remedial Investigation Report - Document that describes the characterization of the nature and extent of contamination at a Superfund site, and along with the Baseline Risk Assessment, is used to evaluate potential risks to human health and the environment.

Responsiveness Summary - The part of the Record of Decision that summarizes comments received from the public on the Proposed Plan and provides the Agencies an opportunity to provide a written response.

Volatile organic compounds - Any of various organic compounds that generally have high vapor pressures and evaporate at relatively low temperatures.

June 1992

IDAHO DEPARTMENT OF HEALTH AND WELFARE

DIVISION OF ENVIRONMENTAL QUALITY

Idaho National Engineering Laboratory

Proposed Plan for the

Auxiliary Reactor Area Chemical Evaporation Pond, Idaho National Engineering Laboratory

Overview

The purpose of this ***Proposed Plan*** is to summarize information and seek public comment on the recommendation by the Department of Energy, Environmental Protection Agency, and state of Idaho that no remedial action be taken for the sediments within the Chemical Evaporation Pond at the Auxiliary Reactor Area. This proposal is based on a ***Remedial Investigation Report***, including the baseline risk assessment, and is available in the Administrative Record at the locations listed on page C-7. The risk assessment demonstrates that the site does not pose an unacceptable risk to workers or future populations. The Auxiliary Reactor Area is located in the southern portion of the INEL, which is in southeastern Idaho (see Figure 1).

The Department of Energy, Idaho Field Office (DOE-ID), prepared this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (***CERCLA***; also known as "Superfund"), and in accordance with the *INEL Community Relations Plan*. An investigation was conducted at the Chemical Evaporation Pond by the DOE-ID with oversight by the U.S.

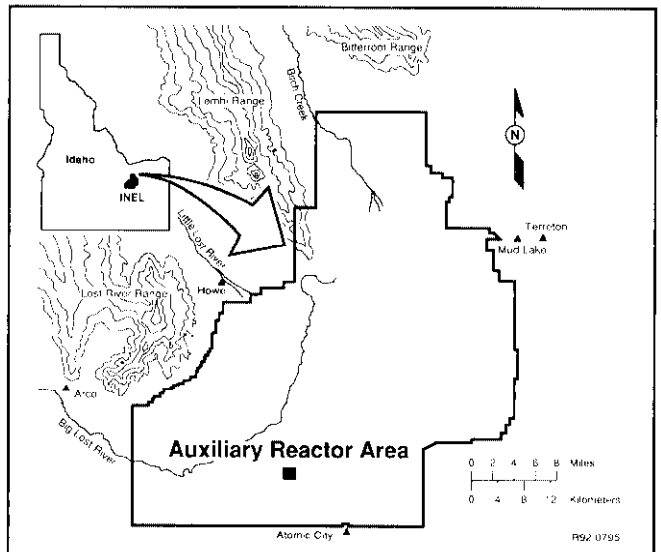

Figure 1. Location of the Auxiliary Reactor Area at the INEL.

Public Meetings

Idaho Falls . . . . . ***Monday, July 20***
Westbank Inn

Burley . . . . . ***Tuesday, July 21***
Burley Inn

Boise . . . . . ***Wednesday, July 22***
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University Inn

An open house is scheduled at each location from 5:30 p.m. to 6:30 p.m. All meetings begin at 6:30 p.m. Both verbal and written comments will be accepted.

Public Comment Period

July 6, 1992 to August 5, 1992

Contents

Environmental Protection Agency (EPA) and the Idaho Department of Health and Welfare (IDHW) (hereinafter referred to as the Agencies). The Remedial Investigation Report was developed in accordance with the ***National Contingency Plan*** to determine the potential risks posed by contamination in the Auxiliary Reactor Area Chemical Evaporation Pond sediments.

This Proposed Plan summarizes information found in the *Final Remedial Investigation Report for the Auxiliary Reactor Area Chemical Evaporation Pond (Operable Unit 5-10)* (EGG-WM-10001), which is available for public review in the ***Administrative Record***. The Administrative Record contains all technical and supporting documentation used to prepare this Proposed Plan. Copies of the Administrative Record may be reviewed at the Information Repositories listed on page C-7.

A glossary of technical and administrative terms used in this Proposed Plan is included at the end of the text. ***Words in bold italics are defined in the glossary.***

How You Can Participate

The purpose of this Proposed Plan is to solicit public input on the "No Action" proposal. "No Action" is proposed by the Agencies based on an evaluation of the risks posed by exposure to contaminants in the Chemical Evaporation Pond sediments. The Agencies will consider all public comments on this plan in preparing a ***Record of Decision***. Comments will be summarized and responses will be provided in the ***Responsiveness Summary*** section of the Record of Decision.

Verbal or written comments may be made during the public meetings, or comments may be submitted in writing anytime throughout the comment period: July 6 to August 5, 1992.

A briefing on this Proposed Plan is available to interested citizens during the weeks of July 6 and July 13. The format for a briefing will vary depending on the number of people requesting it in each community. To request a briefing, call the INEL Community Relations Plan Coordinator at (208) 526-6864.

Background

The INEL is a government-owned, contractor-operated DOE facility that encompasses approximately 890 square miles on the Eastern Snake River Plain in southeastern Idaho. The primary missions of the INEL are nuclear reactor technology development and waste management.

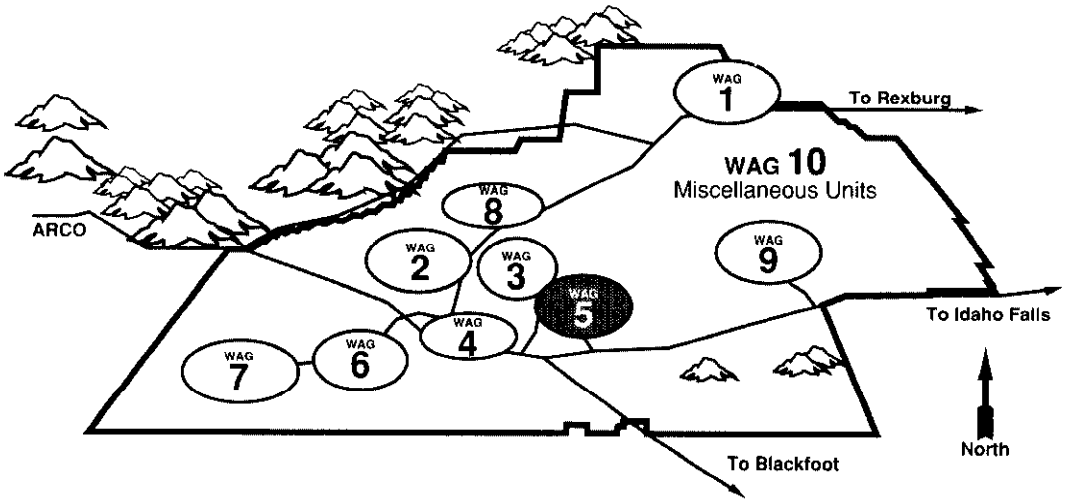
In November 1989, the INEL was placed on the ***National Priorities List*** (NPL), which designates hazardous waste sites requiring investigation under the Superfund law. Sites are placed on the NPL as a result of a ranking system that assesses the seriousness of threats posed to human health and the environment due to actual or potential environmental contamination. Once these sites are identified, they are investigated under the CERCLA process.

To better manage the investigations, the INEL has been divided into 10 Waste Area Groups (see Figure 2). Each Waste Area Group contains several waste disposal areas called operable units. This strategy allows the Agencies to focus available cleanup resources on those areas that pose the greatest potential risks to human health and the environment. Waste Area Group-5 consists of 13 operable units located at the Power Burst Facility and the Auxiliary Reactor Area. The Chemical Evaporation Pond is Operable Unit 5-10.

The characterization and cleanup of each operable unit at the INEL are guided by the ***Federal Facility Agreement and Consent Order*** and ***Action Plan***. These documents, negotiated by the Agencies, provide procedures and schedules to ensure that cleanups at the INEL will be conducted in accordance with applicable state and federal environmental laws.

Site Description

The Auxiliary Reactor Area Chemical Evaporation Pond is an unlined surface impoundment that was used to dispose of wastewater from Building 627, and is located adjacent to the Auxiliary Reactor Area-I facility (see Figure 3). This is one of four satellite locations that comprise the Auxiliary Reactor Area facilities, located 7.5 miles east of the Central Facilities Area. The remedial



WAG 1 Test Area North
WAG 2 Test Reactor Area
WAG 3 Idaho Chemical Processing Plant
WAG 4 Central Facilities Area
WAG 5 Power Burst Facility/Auxiliary Reactor Area
WAG 6 Experimental Breeder Reactor-I/ Boiling Water Reactor Experiment
WAG 7 Radioactive Waste Management Complex
WAG 8 Naval Reactors Facility
WAG 9 Argonne National Laboratory-West
WAG 10 Miscellaneous Units including the Snake River Plain Aquifer

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Figure 2. Map of Waste Area Group (WAG) locations at INEL.

investigation focused on the characterization of surficial sediments within the pond site.

The area affected by waste disposal also includes the drain pipe between Building 627 and the Chemical Evaporation Pond. Discharge from the drain pipe flowed through a shallow, sloping ditch into the pond. The ponded area was roughly circular and approximately 66 feet in diameter (see Figure 4). The sediments with the highest contaminant concentration levels were found within an area of approximately 100 square feet adjacent to the pond inlet.

Source of Contamination

Auxiliary Reactor Area-I is presently a surplus facility and no future use of the buildings is anticipated. The facility has been used in the past as a nuclear research reactor area, research

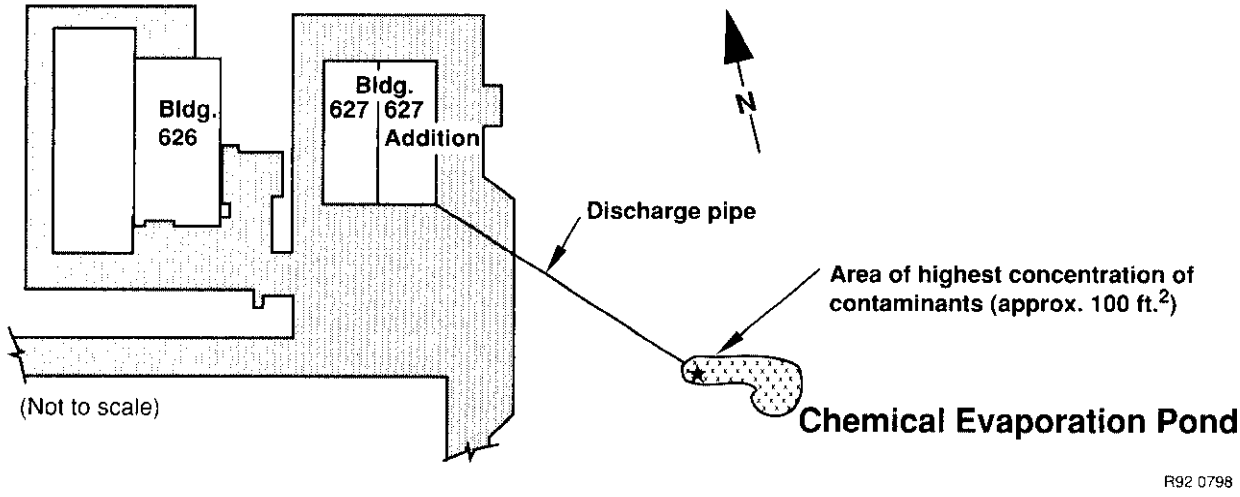

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Figure 3. Map of the Auxiliary Reactor Area facility and the Chemical Evaporation Pond.

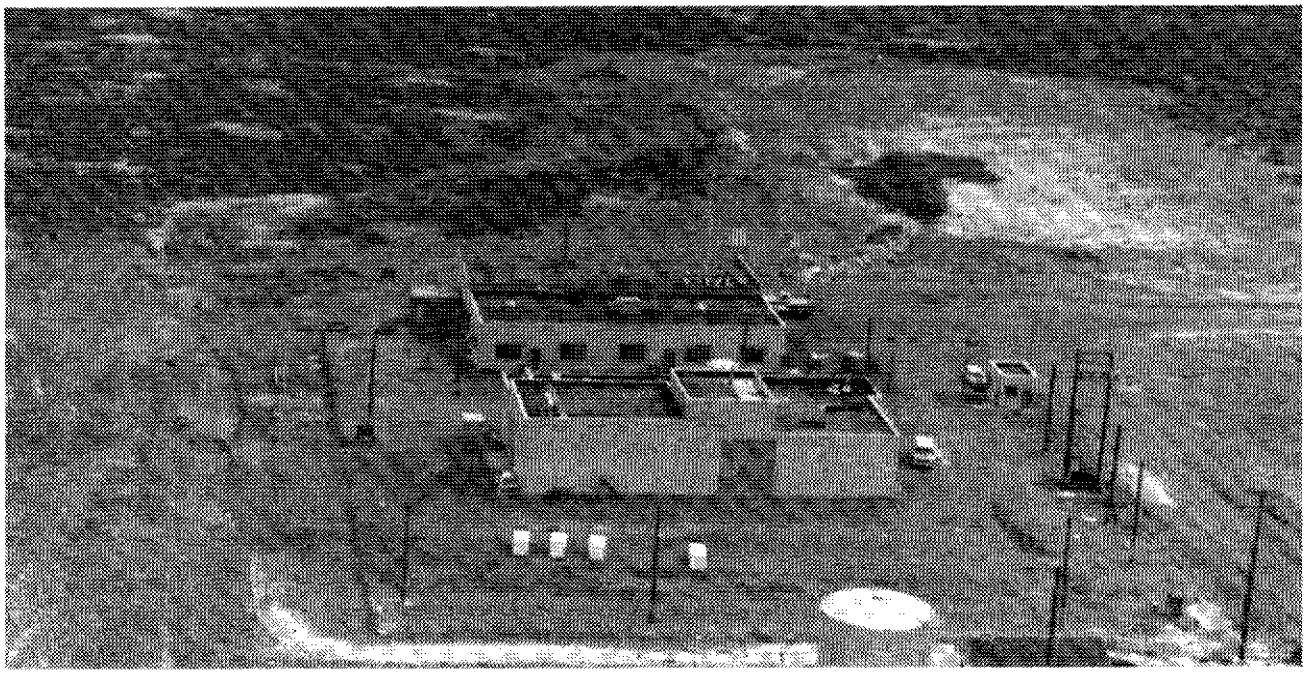

Figure 4. Photograph of Auxiliary Reactor Area with Chemical Evaporation Pond in the background.

laboratories, and for various operations related to examination or storage of radioactively contaminated materials. Although work relating to storage of radioactive contaminated material was conducted at Auxiliary Reactor Area-I, this facility was never used as an actual storage site. The Auxiliary Reactor Area-I facility comprises two main buildings: ARA-626 and ARA-627. No discharge pathway exists from ARA-626 to the Chemical Evaporation Pond. Therefore, the remedial investigation did not address ARA-626.

Building 627 was a print shop that operated from about 1955 to 1971. In 1971, the building was expanded and modified to serve as a research laboratory for materials development and testing. The 1971 construction included the Chemical Evaporation Pond and the waste line from Building 627 to the pond. In 1980, the building was further modified to incorporate a radiochemistry laboratory, which operated until 1988. At that time, operations were discontinued.

During the operation of the research laboratory from 1971-1984, small amounts of radioactive and nonradioactive waste were generated. Radioactively contaminated acids were treated at the Idaho Chemical Processing Plant. The nonradioactively contaminated acids and volatile organic compounds were discharged to the Chemical Evaporation Pond.

During 1980-1988, radiochemistry laboratory technicians performed extractions to determine potential leaching of radionuclides from waste forms and other inorganic media. Trace amounts of radioactivity and volatile organic compounds used were discharged to the pond. In 1988, the radiochemistry laboratory was moved to Test Reactor Area, and discharges to the pond ceased, except for spent housecleaning fluids and sanitary wastewater from within Building 627.

The United States Geological Survey estimates that for ponding to occur, approximately 4,300 gallons per day of wastewater would have to be discharged to the pond. However, this should be considered a historical maximum daily discharge amount, as ponding was not continuous throughout the years of operation. Since 1988, the facility has not been in operation, and flow to the pond has been limited to surface runoff and maintenance operations.

On the basis of site observations, it appears the pond was constructed by excavating native soil to create a topographic depression. Basalt outcrops are present within the pond and immediately adjacent to the pond. A maximum sediment depth of 3.5 feet was measured during 1990 field

sampling, and the average sediment depth is approximately 1.5 feet.

Type and Extent of Contamination

Data collected during the Remedial Investigation revealed the presence of metals, volatile organic compounds, and radionuclides in the soils of the Chemical Evaporation Pond. Samples collected in 1990 were analyzed for metals, volatile organic compounds, and gamma- and alpha-emitting radionuclides. Four of the samples collected were from areas expected to show the greatest level of contamination and were analyzed for a broad range of contaminants referred to as hazardous constituents under the federal and state hazardous waste programs.

Several of the constituents that were identified at the site also occur naturally in local soils and sediments. These naturally occurring concentrations are commonly referred to as "background levels". The background levels for metals and radionuclides were established using samples specific to the Auxiliary Reactor Area-I area. Background samples were collected about 100 feet to the southeast of the pond, in an area not likely to have been affected by past operations. Background levels were not established for the volatile organic compounds. In order to determine the contamination attributable to site operations, background levels were compared to the concentrations of contaminants measured in pond sediments.

Contaminants of Concern

Metals, including arsenic, barium, beryllium, cadmium, chromium, lead, mercury, nickel, selenium, silver, tin, vanadium, zinc, and thallium, were detected in pond sediments in concentrations that exceeded the estimated upper range of background for metals in soils at the INEL (see Table 1). Three volatile organic compounds, specifically methylene chloride, acetone, and toluene, were detected in discrete areas of the pond sediments. The radionuclides cesium-137, cobalt-60, cesium-134, plutonium-239, and uranium-234 were detected in the pond sediments in excess of background concentrations.

Table 1. Metals concentrations in Chemical Evaporation Pond sediments.

Metal	Concentration range in sediments mg/kg (parts per million)	Average background concentration mg/kg (parts per million)
Antimony	3.3 - 16.8	15.07
Arsenic	7.4 - 11.6	5.53
Barium	105.0 - 293.0	214.4
Beryllium	0.53 - 2.2	1.12
Cadmium	0.95 - 3.8	1.62
Chromium	22.2 - 69.0	26.33
Lead	7.0 - 43.9	20.81
Mercury	0.02 - 2.8	0.033
Nickel	17.7 - 36.00	22.12
Selenium	0.15 - 1.2	0.23
Silver	4.3 - 15.0	6.61
Tin	9.6 - 21.7	18.05
Vanadium	39.6 - 68.0	42.12
Zinc	25.3 - 312.0	68.43

The contamination occurred primarily in the sediments beneath the ponded area. The sediments with the highest contaminant concentrations were found within an area of approximately 100 square feet adjacent to the pond inlet (see Figure 3).

Summary of Site Risks

For comparison to other facilities and to assist in the risk assessment, two scenarios were developed to evaluate potential risks to humans. These included a present use worker scenario (occupational exposures) and a future use scenario (residential exposures). A detailed discussion of the risk assessment assumptions and processes is presented in the Remedial Investigation Report. The potential for workers and residents to be exposed to contaminants by inhalation, ingestion, direct contact, and direct exposure to radiation fields was examined.

Each risk assessment senario is first evaluated using EPA default exposure parameters. Default exposure parameters are conservative and are used to establish a baseline for comparison. A site-specific risk assessment for each senerio is then developed. This reflects site conditions as they exist today and are likely to exist in the future.

Table 2. Summary of risks at the Auxiliary Reactor Area Chemical Evaporation Pond.

Scenario	Contaminants	A. Carcinogenic Risk		B. Non-Carcinogenic Risk (Hazard Index)	
		Default	Site-Specific	Default	Site-Specific
Occupational (ARA workers)	Radionuclides	2 in 100,000 ($2x10^{-5}$)	2 in 10,000,000 ($2x10^{-7}$)	NA*	NA
	Chemicals	3 in 10,000,000 ($3x10^{-7}$)	2 in 100,000,000 ($2x10^{-8}$)	0.07	0.007
	Total worker risk	2 in 100,000 ($2x10^{-5}$)	2 in 10,000,000 ($2x10^{-7}$)	0.07	0.007
Future Residential	Radionuclides	3 in 1,000,000 ($3x10^{-6}$)	1 in 1,000,000 ($1x10^{-6}$)	NA	NA
	Chemicals	8 in 10,000,000 ($8x10^{-7}$)	4 in 10,000,000 ($4x10^{-7}$)	0.09	0.09
	Total residential risk	4 in 1,000,000 ($4x10^{-6}$)	1 in 1,000,000 ($1x10^{-6}$)	0.09	0.09

* Hazard indices are not applicable to radionuclides.

In the ***Baseline Risk Assessment***, the potential for both carcinogenic and noncarcinogenic toxic effects was computed (see columns A and B on Table 2). Noncarcinogenic contaminants resulted in a ***hazard quotient*** of less than one (1) for both the occupational and residential scenarios.

Carcinogenic risks are evaluated by comparison to the acceptable risk range of 1 additional chance in 10,000 of lifetime cancer risk to 1 chance in one million (1×10^{-4} to 1×10^{-6}). The range has been established by the EPA for evaluating risks from contamination at National Priorities List sites. The greatest potential for carcinogenic effects to both workers and future residents was from exposure to direct ionizing radiation. The increased incidence for carcinogenic risk was determined to be 2 in 10,000,000 for the occupational scenario and 1 in 1,000,000 for the residential scenario. These calculated probabilities are within or below the acceptable risk range for increased cancer incidence as specified in the National Contingency Plan.

In addition to the human health risks discussed above, computer modeling was completed to assess the migration of the contaminants to the groundwater. The results of this modeling show that regulatory standards for groundwater would not be exceeded. However, the groundwater pathway and subsurface conditions will be evaluated in a future investigation in a different operable unit.

Summary of the "No Action" Proposal

Based on the estimated risks shown in Table 2, the contaminated sediments in the Chemical Evaporation Pond do not pose unacceptable risks to human health or the environment. Therefore, the Agencies recommend that "No Action" be taken.

The Remedial Investigation Report and other information that supports the "No Action" proposal are available in the Administrative Record, copies of which are available at the Information Repositories listed on page C-7.

Addresses

The Agencies encourage your participation in this process. If you wish to make comments on this Proposed Plan for "No Action" before the end of the comment period, August 5, 1992, please write to:

Jerry Lyle, Deputy Assistant Manager
Environmental Restoration and
Waste Management
DOE-Idaho Field Office
P.O. Box 2047
Idaho Falls, ID 83403-2047

You may also make verbal comments while attending one of the public meetings listed on page C-1. Your comments are important. Both written and verbal comments on the plan will be evaluated, summarized, and responses provided in the Responsiveness Summary section of the Record of Decision for the Auxiliary Reactor Area Chemical Evaporation Pond sediments.

Additional Information

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State of Idaho
Idaho Department of Health and Welfare
Division of Environmental Quality
1410 N. Hilton
Boise, ID 83706
1-800-232-4653 or (208) 334-5860

Information Repositories

INEL Technical Library
1776 Science Center Drive
Idaho Falls

Idaho Falls Public Library
457 Broadway
Idaho Falls

Twin Falls Public Library
434 2nd Street East
Twin Falls

Pocatello Public Library
812 East Clark Street
Pocatello

Boise Public Library
715 South Capital Blvd.
Boise

Recycled/recyclable

Glossary and Acronyms

Administrative Record - Supporting information and analyses upon which the Agencies base their recommendations in a proposed plan. Following the public comment period, records of public comments are added, which the Agencies review and consider before reaching a decision. The Record of Decision and Responsiveness Summary are also added to the record, after approval by the Agencies.

Baseline Risk Assessment - Procedures established by EPA for evaluating potential risks to human health and the environment, which involve gathering, organizing, and presenting information on the toxicity of and potential exposures to contaminants. The baseline risk assessment identifies the level of risk that exists if no cleanup is performed, and allows risk-based decisions to be made regarding the need for cleanup.

CERCLA - (Comprehensive Environmental Response, Compensation, and Liability Act, commonly called Superfund) - A federal law passed by Congress in 1980 that establishes a program to identify sites where hazardous substances have been, or might be, released into the environment, and to ensure that the sites are remediated. CERCLA was modified by Congress in 1986 with the Superfund Amendment and Reauthorization Act.

Federal Facility Agreement and Consent Order (FFA/CO) and Action Plan - The agreement between U.S. Department of Energy, U.S. Environmental Protection Agency, and state of Idaho that establishes the framework for CERCLA activities at the INEL. The ***Action Plan*** defines the schedules and procedures for implementing the agreement.

Hazard Quotient - Exposure intakes, when compared to reference doses, produce a ratio or "hazard quotient," which, if less than 1, indicates that it is unlikely for even sensitive populations to experience health effects.

National Contingency Plan - CERCLA regulations (40 CFR 300) that establish requirements for responding to releases of hazardous substances in the environment and set cleanup standards.

National Priorities List (NPL)- EPA's list of the most serious hazardous waste sites identified for investigation and possible long-term remedial action under CERCLA. Sites are placed on the NPL as a result of a ranking system that assesses the threats posed to human health and the environment due to actual or potential contamination. The purpose of the NPL is to inform the public of the most serious hazardous waste sites in the nation.

Proposed Plan - A document that provides a brief summary of the key factors leading to the Agencies' recommendation. Public comments on the plan are solicited by the Agencies and are used during the development of the Record of Decision.

Record of Decision - A public document that presents the selection of a remedial alternative under CERCLA by technically describing the selected remedy and providing summary information about the site. It contains the Responsiveness Summary (see below).

Remedial Investigation Report - Document that describes the characterization of the nature and extent of contamination at a Superfund site, and along with the Baseline Risk Assessment, is used to evaluate potential risks to human health and the environment.

Responsiveness Summary - The part of the Record of Decision that summarizes comments received from the public on the proposed plan and provides the Agencies an opportunity to provide a written response.

INEL Environmental Restoration Program
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Idaho Falls, ID 83403-2047

Address Correction Requested